ROCKY MOUNTAIN OILFIELD TESTING CENTER

PROJECT TEST RESULTS

OILWELL POWER CONTROLLER

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RMOTC

TEST RESULTS OF OILWELL POWER CONTROLLER

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PRODUCT: OILWELL POWER CONTROLLER

MANUFACTURER: **DOUBLE M ELECTRIC INC.**
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DESCRIPTION: The Oilwell Power Controller (OPC) is a prototype developed under the Energy-Related Inventions Program (ERIP). The device consists of a microprocessor based controller that remotely monitors and indicates the power utilized by the electric motor driving a conventional beam pumping unit. The parameters monitored include the following:

MOTOR OVERLOAD	UNDERLOAD
REAL TIME POWER CONSUMPTION	FLUID PRESSURE
FLUID TEMPERATURE	AMBIENT TEMPERATURE

The system is also capable of monitoring:

TIME CONTROL	SURFACE DYNAMOMETER ANALYSIS
DOWNHOLE VALVE CHECKS	

TEST RESULTS: The test was conducted on Well 38-AX-10, during the period 10/1/93 - 5/31/94.

The well is produced from 3061 ft, in the Second Wall Creek reservoir, with an American 114-143-64 pumping unit. The downhole pump is an API 25-150-RWA-8-4-4. The unit has a Westinghouse TEFC 25.0 HP motor running at 7 SPM. The lifting capacity of the system running at 100% is 151 BPD.

The well production history before and after the test is as follows.

DATE	FLUID LEVEL	OIL BPD	WATER BPD	GAS MCFD	PUMP TIME,%	PUMP EFF,%
O8-93	186 FAP*	3.1	37.0	3.7	33	80
08-93	0	3.8	38.6	6.1	33	85
10-01-93	OPC INSTALLED					
10-93	124	5.2	40.3	7.2	50	61
11-93	0	11.7	46.4	0	50	77
12-93	0	8.1	50.5	12.5	50	78
01-94	0	3.3	38.7	10.0	50	56
02-94	0	5.0	39.1	4.8	50	59
03-94	0	5.1	39.1	5.6	50	59
05-94	0	2.6	32.2	0	35**	66

Fluid Above Pump (FAP) Average run time with Pump Off Control (POC) installed.

The OPC unit was installed on 38-AX-10 on 10-1-9.3. Prior to the installation of OPC the well was on a 33% time clock cycle with a pin clock setting of 15 min on and 30 min off. The OPC was set to operate at that same time cycle for about two weeks. Upon retrieval of the data from the OPC it was determined that the well was not in a pumped off condition. The time control was changed to 16 min on and 16 min off.

A production increase was obtained from the well for the next two months. Near the middle of December the well production decreased and the well was in a pumped off condition.

During this same period a gas injection test was started in the same formation on a well 1 1/2 miles away. oil and gas production increases were observed on wells between the injector and 38-AX-10. The increase in production in oil and gas at 38-AX-10 may have been the result of this gas injection.

The pump efficiency decreased from 85% in October to 59% in March. Although the decrease in pump efficiency was accompanied by an increase in run time from 33% to 50%, it is not a function of the run time. In fact, the pump was failing and had to be replaced in May.

The pump-off control feature was installed in May. The pump efficiency increase in May could be attributable to either the pump change or to the pump-off control feature.

PUMP-OFF CONTROLLER AND VALVE CHECK FEATURE:

The pump off controller feature of the OPC uses an extremely accurate unit speed measurement as a way to determine pump off violation. When the speed of the pumping unit increases, a pump off condition is indicated and the unit is stopped. This method appears to be consistent and reliable.

The downhole pump valve check program was installed at the end of May. The fluid load on the valves is measured over a period of seconds. If a decrease in load is noted then the pump valves have failed and the pump will need to be changed. This feature appears to work as anticipated.

FUTURE ADDITIONS TO OPC:

1. CELLULAR & RADIO INTERPHASE
2. STORAGE OF SURFACE DYNAMOMETER CARDS
3. ADDITIONS TO PUMP OFF PROGRAM

SUMMARY:

The OPC was installed with the anticipation of improving pump efficiency and lowering energy costs.

Neither of these goals were obtained during this test. Pump efficiency decreased and the energy savings were not significant.

The manufacturer plans to develop the unit as a pump-off controller and data logger, with the dynamometer, valve checks, and measurements of power, pressure, and fluid temperature as options.